Committee on Resources,

Subcommittee on Forests & Forest Health

forests - - Rep. Scott McInnis, Chairman
U.S. House of Representatives, Washington, D.C. 20515-6205 - - (202) 225-0691

Witness Statement

STATEMENT OF
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Fire Threat to Humans - Science in the National Fire Plan
Ecological Basis for Fire Management Strategies

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MR. CHAIRMAN AND MEMBERS OF THE SUBCOMMITTEE:

Thank you for the opportunity to appear before you to talk about fire ecology and science and the National Fire Plan. I am Dr. Robert Lewis, Deputy Chief for Research and Development. With me today is one of our preeminent fire ecologists, Kevin Ryan, project leader in fire effects research at the Missoula Fire Laboratory of the Rocky Mountain Research Station. Dr. Ryan is available to discuss the scientific principles that govern fire-adapted systems.

I would first like to introduce the scientific basis for managing fire-adapted ecosystems and then describe the role of science and research in the National Fire Plan.

Fire Ecology and the Scientific Basis for Managing Fire-Adapted Ecosystems

Fire is a major force in shaping ecosystems. But fires can inflict great damage and suffering when they occur in environments heavily inhabited by humans and their structures. This inherent duality - ecological agent and destructive force - creates many dilemmas in fire policy formulation and management. These dilemmas have been exacerbated in recent years by the explosive population growth in the wildland urban interface and the rapid accumulation of vegetation.

To better inform policy and fire management debates and better prepare citizens to live in fire-adapted ecosystems, the science community provides knowledge and analytical judgment and asks hard questions about the consequences of management and policy alternatives. Science can describe the connections of integrated human/biophysical systems, more reliably forecast the occurrence of damaging fire events, and characterize the possible outcomes of policy and management options. Scientists can help managers interpret what they are seeing on the ground and can help design management programs as experiments to better understand how ecological systems operate and alert managers to changes that might be needed in management strategies.

Compared with preindustrial times, wildland fire incidence from 1930 through the 1970s decreased in response to aggressive fire suppression and land use changes. The unintended consequences of these changes have been a significant change in vegetation composition and structure - especially in ecosystems in the Interior West that are tuned to periodic fires at relatively short return intervals. This reduction in wildland fire has destabilized many forested ecosystems that depended on these periodic fires to keep stands thinned of competing underbrush and trees. Understory vegetation has become so dense that wild fires that do occur are larger and more severe than the historical fires. For some fire-adapted ecosystems, the frequency of severe fires has become abnormal, or as we scientists say, outside the range of historical variation.

The severity of these extreme fires poses threats to species persistence, watershed integrity, aesthetics, air quality, and community resilience. Extreme fire behavior can result in loss in soil productivity and site stability, increase sedimentation in streams and water supplies, degrade or destroy critical habitat for fish, wildlife, and plant species, including those at risk of extinction, and increase the spread of invasive weeds or non-native plants. Such fires also emit millions of tons of gases and particulate matter into the air, with negative consequences for human health, carbon balances, and the global climate.

The ecologically sound prescription for this situation is to return fire, on proper terms, to these fire-adapted ecosystems. But it is not simply a matter of letting wildfires burn, because many of these systems are already primed for severe and destructive fire behavior and are festooned with human structures and other values at risk. Frequent, controlled fires - prescribed burning - can be an antidote for sporadic, catastrophic fires. However, many of these systems have missed so many natural fire intervals and have become so encumbered with vegetative fuels that mechanical thinning may be necessary to safely restart natural fire processes. In some of the most overgrown conditions, prescribed burning without thinning could lead to catastrophic escape fires, illustrated vividly in the unfortunate case of the Cerro Grande prescribed fire escape last summer. Fire managers implementing the National Fire Plan are rapidly increasing the use of prescribed fire and thinning in scientifically based prescriptions to reduce fuel and protect multiple resources. These practices pose their own risks and controversies but when applied in scientifically designed fuels programs, they can be used effectively and safely. The alternative, that is no active management, involves all the resource and human losses associated with high intensity fires and the exorbitant costs of trying to suppress them.

Many policy questions surround the fire problem. These policy questions are heated, confusing, and often come disguised as science questions. We must remember that these questions are not solely scientific questions and that many non-scientific considerations - e.g., policy, law, and economics - must be part of the answer to these policy questions. While science can provide a more solid foundation for management decisions, science alone cannot answer these questions.

However, we realize that not everyone agrees that active management is warranted to reduce wildfire risk. In the context of debate about fire management and policy options, scientific understanding is sometimes misrepresented, oversimplified and taken out of context. This practice is unfortunate and detracts not only from the quality of the deliberation about fire and land management strategies but also severely hampers the ability of agencies to build public confidence and trust needed to implement positive changes. We feel it is important to base policy and management choices on the body of knowledge, not statements or snippets lifted from reports to justify a point. It is the duty of the scientific community to be as clear as possible about what is known and not known about a body of science to put statements in their proper context, and to correct distortions and misrepresentations. This is extremely important in the field of fire ecology, the source of knowledge for strategies for fire-adapted ecosystems.

We acknowledge that we much to learn - or, as I will discuss later, -- important knowledge gaps that we must attack. Some of these knowledge gaps relate to areas of identified misperception. Some, but certainly not all, of the more common misperceptions are:

A. *That the incidence of high intensity fire is not unusual and is not indicative of systems that are uncharacteristically stressed*. Records clearly show that the acreage burned is substantially higher in the last 10 years than in the previous seven decades. The number and intensity of extremely large fires has increased due to a combination of factors including fuels condition changes, climatic variation, initial attack, and suppression capability.

B. *That harvesting trees exacerbates fire risk*. In the early part of the last century when more logging slash was left than is left today, this was true. Modern harvesting operations, based on scientifically sound silvicultural prescriptions, use material more efficiently and follow up rapidly with burning or mechanical reduction of residues, the risk of fire is minimal. Thinning trees in conjunction with subsequent prescribed burning is an effective strategy for reducing fire risk.

C. *That fires should be left to burn because fire is a natural part of the ecosystem*. Forest Service and other agencies have wilderness and other areas where planning has deemed that fires can burn naturally and benefit the ecological and other objectives of the area. However, in much of the West, fuels have accumulated so much that fires left to burn can quickly become extreme events with a range of devastating consequences. We have initiated new research that will sharpen our ability to determine where relaxed suppression is appropriate and how wildland fires and prescribed burning can be used to achieve ecological and other objectives at the landscape level.

D. *That mechanical removal of fuel is unnecessary and that prescribed burning alone can effectively reduce fuels*. The Cohesive Strategy, based on a scientific analysis of the vegetative condition of the western forests, recommends that the most overgrown systems, having missed several fire cycles, will require mechanical thinning before any prescribed burning can be done safely. This strategy is the fuels management core of the National Fire Plan and is based on returning fire in its natural role to fire-adapted ecosystems. To build an even stronger scientific basis for strategy, we are researching ways to make fuels management prescriptions economically feasible and environmentally sensitive.

E. *That we don't have to treat vegetation at the landscape or watershed level since we can protect homes through firesafe construction and home landscaping practices in the immediate interface*. Our research has shown that fire safe practices are effective. However, this research did not negate the ecological and economic rationale for correcting problems at the landscape level. There are many reasons to minimize the frequency and impact of uncharacteristically intense fires including ecological values, aesthetic conditions, business and infrastructure, human health, quality of life and efficient use of taxpayer's dollars. Home protection and landscape health should fit together in an integrated protection strategy supported by scientific advances on all fronts.

Science and the National Fire Plan

Science plays a key role in the National Fire Plan. Each of the key points of the National Fire Plan have a science basis that has helped shape what is possible and what is sound. Forest Service Research and Development has sustained an active program of wildland fire research since the 1920's. It remains the world's premier organization in wildland fire science. We collaborate closely with research agencies, universities, and the private sector and work closely with fire management operations to refine research needs and ensure technology adoption. For example, firefighting procedures are based on findings from years of past and ongoing work in the fire behavior, meteorology, economics, operations research and engineering development. Rehabilitation and recovery methods are becoming more effective and efficient thanks to rigorous testing and environmental evaluation. Fuels reduction strategies have been developed and are being refined by scientific investigations at various scales to quantify the effects of removal and burning regimes on potential fire behavior and a suite of ecological values and processes. These ongoing studies, in close collaboration with managers, are helping us understand how to plan fuels and vegetation treatment and enlighten us about the consequences of not taking active measures to manage fuels. They are showing us how to remove and use fuels materials we might otherwise burn and add to air quality problems. A growing body of social science shows us how to work with the public and the new fire science of structural ignition is showing us how to effectively protect homes in the interface.

It is a long-standing responsibility of Forest Service research to build the science base to protect forest ecosystems and to restore at risk systems to healthy conditions. We know that the science basis for some key questions is more complete than for others. We are working to fill these knowledge gaps and to help managers and the public think through problems with the best technical assistance and expertise. We know, for example, that many managers in recent fire seasons have observed dramatic reductions in fire spread and intensity as fires entered stands that have been thinned or previously burned. Scientific validation of these landscape scale phenomena is complex and involved, but we are working with managers closely to establish parameters for interpreting these events and setting up landscape scale experiments to help establish guidelines for future management.

We have many examples of successful collaboration between users and research that have resulted in science-based tools in common use such as:

- National Fire Danger Rating System
- Fire retardant technologies
- Fire Effects Prediction Systems
- Smoke Management Systems
- Fire Behavior Prediction Systems
- Fire Hazard Mapping and Fuel Models
- Fire Management Planning and Economic Analysis Systems
- Fire safety and health guidelines

We have parlayed this successful relationship into an intensified program of research and development made possible by the National Fire Plan funding. In FY 2001, increased fire-related research and development in the Forest Service (including the Joint Fire Science Program) has been invested in 63 research and development work units. These units are already turning out useful products to support goals in each of the first four key points of the National Fire Plan.

In addition, the Joint Fire Science program, established by Congress in 1998, also supports the development of information and tools for fuels management. This interagency research and development program was funded at $ 16 million each with equal $8 million contributions from the Departments of Interior and Agriculture. The National Fire Plan doubled the size of the Joint Fire Science program in FY2001. There is an important complementary relationship between the Joint Fire Science program and the Forest Service research and development programs. The Joint Fire Science program does not employ scientists or manage other elements of scientific capability such as facilities, equipment, and support staff. The program focuses on applied research on issues that relate to fuels management, while the Forest Service research program provides scientific capability and focuses on long-term issues and fundamental science related to forest health, fire hazard, and the social and economic consequence of fire and other disturbances.

For FY 2002 and beyond, the science base for The National Fire Plan and the Cohesive Strategy will attack important knowledge gaps. Top priority areas for research and development are:

Firefighting

- Tools to assist the integration of fire management with land management planning
- Improved predictions of fire behavior and fire season severity.
- Improved organizational effectiveness and safety practices

Rehabilitation and Recovery

- Improved effectiveness of rehabilitation (Emergency Stabilization and Rehabilitation) treatments
- Understanding of the effects of post fire treatments on wildlife
- Methods for reestablishing native species and excluding invasive exotic plants.

Hazardous fuels reduction

- Techniques for assessing and managing fire risk at landscape scales.
- Integrated silvicultural, processing, and marketing systems to economically reduce fire hazards.
- Testing the effectiveness and the environmental effects of different fuel treatments

Community assistance

- Better understanding of public knowledge, beliefs, and attitudes about fire and fire management.
- Strategies for integrating fire and fuels management with sustainable community development.
- Strategies for reducing the vulnerability of homes and communities.

Summary

In summary, Mr. Chairman, the science community provides knowledge and analytical judgment to better inform policy and fire management debates and to better prepare citizens to live in fire-adapted ecosystems. In the context of debate about fire management and policy options, scientific understanding is sometimes misrepresented or oversimplified. It is the duty of the scientific community to be as clear as possible about what is known and not know about a body of science, to put statements in their proper context and to correct distortions and misrepresentations. Science plays a key role in the National Fire Plan. Each key point of the National Fire Plan has a science basis that has helped shape what is possible and what is sound. We are working to expand knowledge and to help managers and the public think through the problems with the best technical assistance and expertise.

This concludes my statement. Dr. Ryan and I would be happy to answer any questions you or members of the Subcommittee might have.

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